WIND RESISTANCE EXPLAINED; CARS NEED 'ENTRANCE LINES'

FROM MOTOR.

SO MUCH has been said about the streamline body, and the way in which automobile designers endeavor to cut down wind resistance that it may be of interest to shed a little light on the subject and to tell what wind resistance really means. We are used to hearing such expressions as "cutting through the air," and other phrases of a similar nature, but many people interested in the subject from the automobile standpoint would like to know just how much pressure really exists and just how much power is absorbed in overcoming the resistance of the air.

We all know that this fluid we call air and which forms the atmosphere of the earth rests upon the surface of the earth and surrounds it for a considerable distance. It seems to be an intangible substance which does not oppose us in the least as we walk about, but as soon as we begin to move at speeds much higher than we were intended to move by nature, it exerts its influence to a marked extent.

Explanation Of Wind.

At other times, when we ourselves are stationary, the air will move, causing what we call a wind and exerting a pressure in much the same way. Tall buildings have to be designed to resist this wind and also to minimize its effect. The pressure of the wind is utilized as power in windmills and in sailing vessels.

Wind, in other words, is the relative motion of a body to the air surrounding it, and this relation is quite similar whether the air is still and the body moving, the body still and the air moving or both. The relative velocity of the wind is the sum of the velocities of the object and the wind if they are moving in opposite directions, or the difference if they are moving in the same direction. For instance, if the velocity of the wind is 30 miles per hour, and a car is going 30 miles per hour, into the wind in the opposite direction, the relative velocity of the wind to the car is 60 miles per hour. On the other hand, if the car were traveling with the wind at 30 miles per hour, the relative velocity of the wind would be zero. The pressure exerted by the wind on a moving body is governed by its relative velocity to that body.

The average man, walking briskly, travels at about 4 miles per hour. His body presents to the air a surface of about 6 feet in height to 1 foot in width, or about 6 square feet. Moving at 4 miles per hour, he is traveling at 5.8 feet per second, and the resistance opposed to his forward motion by the air, assuming it to be still, is just about ½ pound. In other words, he is continually pushing a ½-pound resistance ahead of him as he walks.

Need Of "Entrance Lines."

If the same man walking 4 miles per hour were facing a gale blowing 2 miles per hour, the relative velocity of the wind would be 30 miles per hour, and the man would be walking against a pressure of over 26 pounds. This would be enough to make an appreciable difference in the ease of walking and he would readily notice it.

The resistance that the air interposes to the progress of the car is of two kinds. There is first the resistance that is caused by striking the bank of air that is always in front of the car, in other words, the wind resistance, and there is also the resistance that is caused by the friction of the air along the car. This second resistance is what is known as skin resistance. It is so small in relation to the wind resistance that it can be passed by unnoticed.

The ordinary type of passenger car or truck presents a flat surface to the wind. In other words, there are no "entrance lines" such as there are in a boat for the purpose of opening an easy path into the fluid. Thus the wind resistance can be calculated directly from the total area of the plane surface which forms the front surfaces of the car.

Table Showing Resistance.

This entering area is composed of the radiator, lamps, projected surface of the fenders, windshield, front axle, front edges of the wheels and whatever else may be on the entrance side of the car. On the ordinary type of touring this area is about 16 square feet. The accompanying tabulation shows the resistance per square foot at different car speeds and with this table it is quite easy to know the number of pounds that the car has to overcome in traveling at different speeds.

Wind Resistance at Different Speeds.

Miles Per Hour	Feet Per Second	Pressure Per Sq. Ft. in Pounds	Miles Per Hour	Feet Per Second	Per Sq. Ft. in Pounds Pressure
1	1.47	0.005	18	26.4	1.55
2	2.93	0.020	20	29.34	1.968
3	4.4	0.044	25	36.67	3.075
4	5.87	0.079	30	44.01	4.429
5	7.33	0.123	35	51.34	6.027
6	8.8	0.177	40	58.68	7.872
7	10.25	0.241	45	66.01	9.963
8	11.76	0.315	50	73.35	12.30
9	13.2	0.400	55	80.7	14.9
10	14.67	0.492	60	88.02	17.71
12	17.6	0.708	66	55½	20.85
14	20.5	0.964	77	102.5	24.3
15	22.00	1.107	75	110.	27.7
16	23.48	1.25	80	117.36	31.49
			100	146.67	49.3

Keep Check On Tires; Use Your Speedometer

KEEP careful track of your tire mileage and you can then face the tire adjuster with a clean cut story that will insure you best treatment. Note when tire was put on and the speedometer reading. Also note when tire was removed and the reading. Keep careful record of mileage in each case, and you will be gratified to find a tire running way beyond its guarantee.

MUFFLER GETS CLOGGED; GIVES DRIVER TROUBLE

A chauffeur recently made the complaint that his car, an eight, was not running right. It showed no power and above all there was a peculiar noise coming from the muffler tail pipe. The noise sounded like high pressure steam escaping. The chauffeur was certain a cylinder jacket had cracked allowing water to get into the exhaust like, where it turned to steam. An investigation showed that the muffler was clogged. This caused the noise by increasing the exhaust pressure and it also caused the great loss of power, because some of the exhaust backed up into the cylinders.

AUTO-GRAPHS

P. W. BITTICK is general manager of the West Texas Motor company of this city, southwestern distributors for the Haynes and Stephens Six motor cars. Mr. Bittick is one of the youngest men in the automobile field, being about to cast his first vote for president of the United States. He spends quite a great deal of his time motoring through New Mexico and Arizona, visiting Haynes and Stephens dealers. He is quite an authority on the roads of these states, there being few if any motor roads that he has not driven over. He hails from the "Show Me" state, but hopes to spend the rest of his life in El Paso. Stated last week that he was happily married and liked to do carpenter work around the house. Mr. Bittick's one hobby is the Stephens Six and he promises to put over a real live stunt with the Stephens in the near future.